Citation:

Rosenheck R. Fast food consumption and increased caloric intake: A systematic review of a trajectory towards weight gain and obesity risk. *Obes Rev.* 2008 Nov; 9 (6): 535-547. Epub 2008 Mar 14. Review.

PubMed ID: 18346099

Study Design:

Meta-analysis or Systematic Review

Class:

M - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To critically examine the existing evidence investigating an association between fast-food consumption and increased caloric intake leading to weight gain and obesity.

Inclusion Criteria:

- Studies published through February 2008
- Cross-sectional, prospective cohort and experimental studies
- Human subjects
- English publications.

Exclusion Criteria:

Prospective studies with a duration of follow-up less than six months.

Description of Study Protocol:

- *Recruitment:*
  - A Medline search was performed using the following search terms: "fast food," "increased energy intake," "weight gain," and "obesity." Additional articles were supplemented by searches of related manuscripts identified from cross-matching references on primary publications
  - More emphasis was placed on cross-sectional studies with more than 5,000 participants, large prospective cohort studies with a long duration of follow-up and experimental intervention trials
  - Food-frequency questionnaires (FFQ) and repeat measures of height and weight were

considered the most advantageous measures of fast-food consumption and weight gain or obesity, respectively
    - No restrictions were placed on the age of study participants
- *Design:* Systematic review
- *Dietary intake/Dietary assessment methodology:* Not applicable
- *Blinding used:* Not applicable
- *Intervention:* Not applicable
- *Statistical analysis:* Not applicable.

Data Collection Summary:

- *Timing of measurements:* All studies considered in the review were published before February 2008
- *Dependent variables:* FFQs were considered the most advantageous measures of fast-food consumption
- *Independent variables:* Repeat measures of height and weight were considered the most advantageous measures weight gain or obesity
- *Control variables:* Not applicable.

Description of Actual Data Sample:

- *Initial N:* 470 potential publications were ascertained using the keyword search
- *Attrition (final N):*
    - N=16 (six cross-sectional, seven prospective cohort, three experimental studies)
    - The majority of citations that were excluded were commentaries or did not assess fast-food consumption and calorie intake or weight change
- *Age:* Not applicable
- *Ethnicity:* Not applicable
- *Other relevant demographics:* Not applicable
- *Anthropometrics:* Not applicable
- *Location:* Not applicable.

Summary of Results:

Cross-sectional Studies

- Findings from cross-sectional studies suggest discrepant associations between fast-food frequency, increased energy intake and overweight or obesity in terms of BMI
- Of the six studies conducted, two were conducted in children, one with both parents and children and three with an adult population.

Reference	Results
Bowman et al, 2004	Children who ate fast-food compared wit those who did not, consumed more total energy (187kcal; 95% CI 109-265), more energy per gram of food (0.29kcal per g), more total fat (9g), more total carbohydrate (24g), more added sugars (26g), more sugar-sweetened beverages (228g), less fiber (-1.1g), less milk (-65g) and fewer fruits and vegetables (-45g)

Jeffery et al, 2006	Those who frequented a fast-food restaurant greater than or equal to one time per week had a BMI beta coefficient of 0.301 compared with those who never frequented fast-food restaurants (P=0.02)
French et al, 2001	Overweight and BMI status was not statistically associated with FFFRU. BMI was significantly lower among males who frequented fast-food restaurants three or more times per week, compared with those reporting less frequent usage
Boutelle et al, 2006	Parents who reported purchasing fast-food for family meals at least three times per week had higher mean BMI (P<0.01) and were more likely to be overweight (P<0.01) than parents who reported less frequency fast-food purchases. No significant associations were found between frequency of fast-good for family meals and adolescent BMI or weight status
Jeffery et al, 1998	In women, fast-food eating was positively associated with BMI. β=0.39 (0.15, 0.64) for high-income women and β=0.85 (0.43, 1.27) for low-income women. In men, no statistically significant association was found
French et al, 2007	No relationship seen among fast-food frequency consumption and BMI

Prospective Cohort Studies

- Of the seven prospective cohort studies, four were conducted in children and adolescents, and three were conducted in young adults
- Six of the seven prospective cohort studies found a positive association between more frequent fast-food consumption and an increase in total caloric intake or BMI.

Reference	Results
Schmidt et al, 2005	Fast-food intake was positively associated with intake of energy and total fat and saturated fat as a percentage of calories. Fast-food intake increased with increasing age. With increasing consumption of fast-good, energy intake increased 1,837kcal for the low fast-good frequency group vs. 1,966kcal for the highest fast-food frequency group (P<0.05)
Pereira et al, 2005	After adjustment for lifestyle factors, baseline fast-food frequency was directly associated with changes in body weight for both African-Americans (P=0.005) and whites (P=0.0013). Comparing the average 15 years weight gain in participants with infrequent (less than once per week) visits to fast-food restaurants, those with frequent fast-food consumption (more than twice per week) gained an extra 4.5kg of body weight (P=0.0054).
Duffey et al, 2007	40% of the sample increased their weekly consumption of restaurant or fast-food (P<0.0001). Higher consumption of fast-food at baseline was associated with a 0.16-unit increase in BMI at follow-up.

Nelson et al, 2006	Twins living apart had statistically significant changes in BMI gain. A non-significant correlation was seen among fast-food consumption. Adolescent household environment accounted for eight to 10% of variation in adolescent fast-food intake and sedentary behaviors and 50% variation in overweight. Young adult fast-food intake was significantly affected by young adult household environment, accounting for 12% variation.
Niemeier et al, 2006	Greater days of fast-food consumption at Wave II (adolescence) predicted increased BMI z-scores at Wave III (young adulthood). For each additional day of fast-food consumption at Wave II, BMI z-score was non-significantly predicted to increase by 0.02 by Wave III.
Thompson et al, 2006	Those who ate quick service food twice a week or more at baseline experienced the highest increase in mean BMI z-score compared with those who ate quick service food once a week or not at all.
Bes-Ratrollo et al, 2006	Consumption of hamburgers, pizza and sausages was independently associated with weight gain. Those who were in the fifth quintile of consumption compared to those in the first quintile had an adjusted odds ratio of 1.2 (P for trend = 0.05) for weight gain.

Experimental Studies

- Two of the three trials were conducted among adolescent participants, while one enrolled adult women 20-45 years of age
- All three experimental studies consistently documented that fast-food consumption was associated with an increase in total energy intake
- Only one study had a sufficient follow-up time of three years in order to evaluate a change in weight status with increased fast-food consumption.

Reference	Intervention and Main Outcome Measures	Results
French et al, 2000	Mail-based intervention; monthly mailed newsletters with return postcards and periodic opportunities to participate in eating and exercise programs; fast-food intake and weight status	Increase in frequency of fast-food consumption was associated with increase in total energy intake, percentage of energy from fat and body weight. An increase of one fast-food meal per week was associated with a weight gain of 0.72kg over the three-year period (P=0.01).
Ebbeling et al, 2004	Study 1: Fast-food meal served to each participants; average consumption Study 2: Energy intake assessed in free-living conditions during days of fast-food consumption and no	Study 1: Mean energy intake from fast-food meal was 1,652kcal among all participants. Overweight subjects ate more than lean participants (1,860 vs. 1,458kcal, P<0.02). Study 2: Overweight subjects

	consumption	consumed significantly more total energy on fast-food days vs. non-fast-food days (2,703 vs. 2,295, P=0.02), a trend was not observed among lean participants.
Ebbeling et al, 2007	Randomly assigned to sequence of three feeding conditions; fast-food meal present as one large serving, fast-food meal portioned into four smaller servings at 15-minute intervals, fast-food meals portioned into four servings served at once; energy intake	Energy intake during a fast-food meal was not affected by portioning or eating rate. Adolescents consumed approximately 50% of energy needs.

Author Conclusion:

- Sufficient evidence exists for public health recommendation to limit fast-food consumption and facilitate healthier menu selection
- More research needs to be conducted specifically in regard to effects of fast-food consumption among sub-populations such as children and adolescents.

Reviewer Comments:

None.

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1.	Will the answer if true, have a direct bearing on the health of patients?	N/A
2.	Is the outcome or topic something that patients/clients/population groups would care about?	N/A
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	N/A
4.	Will the information, if true, require a change in practice?	N/A

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search termsused described?	Yes

3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issued considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes